Procyon, may be regarded as Hellenised Egyptian names by dropping the final syllables, and that they may be thus referred to the Chaldean dialect.

II. Extracts from a Letter to the President, dated Picket Berg, Cape of Good Hope, January 1, 1845, from C. Piazzi Smyth, Esq. Communicated by Captain Smyth.

Great Comet of 1844–5.

"Another splendid comet is at this moment astounding the southern hemisphere and displaying the most interesting series of phenomena, which are passing away unrecorded, because the Institution is still without sufficient means.

"The apparition of this comet, 1844–5, is just such an opportunity, such a crucial test of his theory, as Bessel is so ardently desirous of beholding, provided, however, as he would of course be, with a sufficient apparatus.

"During the nine first days of its appearance to this end of the colony generally, this comet was only seen once at the Royal Observatory on account of the clouds which form so frequently to the west, because Table Mountain is there; and, now the comet is going southward so very fast, that it will probably soon be out of reach of the equatoreal mounting of the telescope. This state of things has already supervened in the case of Mauvais' Comet, which has been observed since October, and is likely to be visible for a long time to come; but from the middle of December its south declination has been so great as to place it beyond the range of the instrument at the best times for observation. Now, therefore, a polar axis mounting is being hastily run up."

Meteorology.—"A large mountain is too generally associated in idea with constant clouds and storms; but two years' experience on great elevations at this end of the colony shews decidedly that the highest position is by no means, on that account solely, liable to most mist, or vexed with most wind: such effects depending more on the proximity of the sea, and the configuration of the neighbouring country.

"Winterhock-berg, 6500 feet high and 60 miles from the sea, had little wind and less mist; but one of its off-sets contains a *kloof*, or cleft, which serves as a vent for the wind which has been blowing up the Worcester and Tulbagh valleys; and, in this kloof, 1200 feet high, there is generally abundance of both wind and cloud,—the latter of that sort which is forming at the same time on the top of Table Mountain, 3600 feet high.

"Kamiesberg, 5500 feet high, a cold mountain, isolated in extensive warm plains, had little wind; but Klyp Rug-berg, only 1000 feet high, situated on the edge of a steppe dividing a cold region from a hot one, was subject to wind, violent and continual beyond example.

"In the plains there generally prevails during summer a certain degree of haziness and indistinctness in the atmosphere, highly prejudicial both to the definition and the intensity of any distant illuminated object. A residence on a high mountain shews that there is spread at such times over the whole lower country a stratum of dry fog to the depth of 3000 or 4000 feet, not affecting the dew-point, of a smoky colour, but so rare as to be unsuspected by a person immersed in it. When he is above its level the peaks of distant mountains in a similar condition appear well defined, and of an intense blue or purple colour, while all below is indistinct, dancing, and boiling, and overcome by a general murkish grey tint. This peculiar fog may last in summer two or three months; in the winter, only as many days, and it is then more rare and attains a greater height. It is usually formed gradually, and is at length precipitated or dissipated by rain; but it is sometimes very sudden, and apparently capricious both in appearance and disappearance; no other important changes being evident at the time.

"What this fog is seems a question very difficult to solve. An infinite number of substances on the surface of the earth are constantly giving out their peculiar vapours; even metals do so, a fact implied by their having a smell; for to be perceived in that manner, particles must be flying off from them as from camphor. How high do such vapours ascend in the atmosphere, how long do they remain suspended, and are they at times precipitated, or are they decomposed?

"Smoke appears to play a part, though, perhaps, a very small one, in the business. From the universal practice all over the colony of 'burning the land,' or the bush, there is seldom a week passes without there being numerous fires burning in one's neighbourhood. In clear, calm weather the smoke from one of these has been seen rising up, cumuliform, 3000 or 4000 feet in height, and then forming a level stratum sometimes fifty miles in length, and this has continued several days, the fire still burning and the calm still enduring. While the dry fog prevails, a smoke from the plains has been seen to rise up 4000 feet and be lost in the upper layers of this haze, while at the same time smoke from the top of a neighbouring mountain 6000 feet high, has only risen up about 200 feet, and has then slanted off *downwards* and mingled with the same.

"In clear weather, on Winterhock-berg the theodolite telescope (aperture 2 inches, power 25) has shewn a pile of rough stones (12 feet high, 12 feet broad at the base, and 3 at the top) on the Cedar mountains, nearly seventy miles distant, so clearly, that an object one-third the breadth of the top would have been abundantly visible. From the same station a man was seen on Picket Berg, 45 miles off; and on this, one of Hottentot's Holland Sneew Kop, the spars at the Lion's Rump signal station (40 miles off), have been most clearly visible. And what is very deserving of notice is,

that some of the very best definition have been witnessed on these mountains in the middle of summer with a light northerly air; while at the same time, in the level country below, a strong south-east wind has been blowing with its usual accompaniment of large, faint, woolly blotches in the place of what ought to have appeared, viz. stellar points."

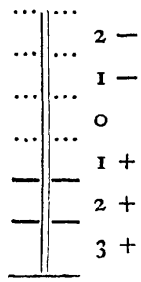
Magnitudes of Stars.—"Bessel's recommendation of steel specula reminds me of a series of astronomical phenomena that are passing unrecorded, viz. the changes in the magnitude of some stars.

"In March 1843, Mr. Mackay wrote from Calcutta to Sir John Herschel that η *Argus* had become as bright as *Canopus*, from which Sir John concluded that η was making another step forward, and would in time rival *Sirius* and the planets. But, after having for a few days in the beginning of the above-mentioned month approximated to *Canopus*, η dwindled down again very rapidly. But Sir John was not far out, for, although the star may not be advancing by successive steps, it seems to be doing the same by undulations; for, in March 1843, it did not go down to the point whence it started, and it is now again on the increase. It is, and has been for a month, brighter than *Canopus*, half way indeed between him and *Sirius*, and is very red.

"Not having been able yet to get my tourmalines applied to a telescope, I cannot report on their actual sufficiency for measuring the magnitudes of stars; the principle, however, seems to answer, inasmuch as a mode of observation is produced, in which the only variable element is angular motion.

"Numerical measurement of the periodical and secular changes in the *colour* of stars would seem to be as important as that of their *lustre*. My plan for doing it cannot be put into action without a clock-moved telescope. The principle is merely this:—a prism is to be introduced into the tube of a telescope so as to make the linear spectrum of a star, instead of the round white image to be viewed by the eye-piece. The mean yellow ray is to be brought by mechanical adjustments to a fixed point in the field, and, the spectrum being divided into a number of spaces of certain angular extent, the brightness of each is to be measured separately, as in the case of the *magnitudes* of the stars.

"White stars of all sizes will, of course, shew the same relative intensities in the different divisions of the spectrum; while coloured stars will exhibit a preponderance in the part which answers to their colour. To eliminate the differences of the effects of the atmosphere, and to determine what is white light, a method must be pursued similar to that in the discussion of the measurement of *magnitudes*; and the *colour* of the star will ultimately be expressed by numbers, without attempting to determine by what particular designation such a tint would be conceived by a person of ordinary eyesight.



"Let this be a spectrum divided into equal angular spaces of 2″ each, the one marked o being the yellow ray; by means of a perforated plate in the focus of the telescope, each of these portions is to be brought singly and successively into view, and have its brightness separately measured as a single star; the several portions of colour will then be represented thus:

	−2	−1	o	+1	+2	+3
Sirius.....	20	40	70	50	30	10
η Argus.....	30	80	40	20	10	0
Canopus.....	10	20	35	25	15	5

"The method is undoubtedly rough, and inapplicable to the smaller magnitudes of stars visible in any telescope, but if a measurement is obtained in numbers (free from theoretical objection), and capable of having the probable error computed, it should be adopted until something better can be advanced.

"It will not do for any one to tell the public, even in the case of the magnitudes of stars, that 'he has tried all instrumental methods, and found all to be inferior to estimation by the naked eye;' because, so long as such a method of observation is the only one followed, so long will the assertion remain mere rhetoric, — a consumption of time without producing its equivalent of useful effect. Let us rather remember the primary and aphorismal foundations of practical science, such as:—

"'Science begins with the observation of common facts, but, even at this stage, requires that the observations be precise.'

"'Facts are the materials of science, but all facts involve ideas, and since in observing facts we cannot exclude ideas, we must take care that for the purposes of science, the ideas be clear and vigorously applied. Therefore, facts for the purposes of material science should involve *conceptions* of the intellect only, and not *emotions*, and must be observed with reference to our most exact conceptions, number, place, figure, motion, force, &c.'"